

CLAIMS

1. A method of screening for a preventive or therapeutic agent for cancer, wherein the method comprises using serine/threonine kinase Pim-1 or a partial peptide thereof, or a salt thereof.
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2. A kit for screening for a preventive or therapeutic agent for cancer, wherein the kit comprises serine/threonine kinase Pim-1 or a partial peptide thereof, or a salt thereof.
3. A preventive or therapeutic agent for cancer, wherein the agent is obtained using the method
10 of screening of claim 1 or the screening kit of claim 2.
4. A preventive or therapeutic agent for cancer, wherein the agent comprises a compound or a salt thereof that inhibits the activity of serine/threonine kinase Pim-1 or a partial peptide thereof, or a salt thereof.
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5. A preventive or therapeutic agent for cancer, wherein the agent comprises a compound or a salt thereof that inhibits the expression of a gene of serine/threonine kinase Pim-1 or a partial peptide thereof, or a salt thereof.
6. A preventive or therapeutic agent for cancer, wherein the agent comprises a polypeptide comprising an amino acid sequence that is identical to or substantially identical to a polypeptide comprising the amino acid sequence of SEQ ID No: 3.
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7. A preventive or therapeutic agent for cancer, wherein the agent comprises an antibody against serine/threonine kinase Pim-1 or a partial peptide thereof, or a salt thereof.
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8. The preventive or therapeutic agent for cancer of claim 4 or 5, wherein the cancer is pancreatic cancer.
9. The preventive or therapeutic agent for cancer of claim 6, wherein the cancer is pancreatic
30 cancer.
10. A method of screening for an apoptosis-inducing agent, wherein the method comprises using serine/threonine kinase Pim-1 or a partial peptide thereof, or a salt thereof.
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11. A kit for screening for an apoptosis-inducing agent, wherein the agent comprises

serine/threonine kinase Pim-1 or a partial peptide thereof, or a salt thereof.

12. An apoptosis-inducing agent obtained using the method of screening of claim 10, or screening kit of claim 11.

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13. An apoptosis-inducing agent, which comprises a compound or a salt thereof that inhibits the activity of serine/threonine kinase Pim-1 or a partial peptide thereof, or a salt thereof.

10 14. An apoptosis-inducing agent that comprises a compound or a salt thereof that inhibits the expression of a gene of serine/threonine kinase Pim-1 or a partial peptide thereof, or a salt thereof.

15 15. An apoptosis-inducing agent that comprises a polypeptide comprising an amino acid sequence that is identical to or substantially identical to a polypeptide comprising the amino acid sequence of SEQ ID No: 3.

16. An apoptosis-inducing agent that comprises an antibody against serine/threonine kinase Pim-1 or a partial peptide thereof, or a salt thereof.

20 17. A method of screening for an anticancer agent potentiator, wherein the method comprises using serine/threonine kinase Pim-1 or a partial peptide thereof, or a salt thereof.

18. A kit for screening for an anticancer agent potentiator, wherein the kit comprises serine/threonine kinase Pim-1 or a partial peptide thereof, or a salt thereof.

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19. An anticancer agent potentiator, wherein the potentiator is obtained using the method of screening of claim 17, or screening kit of claim 18.

30 20. An anticancer agent potentiator, wherein the potentiator comprises a compound or a salt thereof that inhibits serine/threonine kinase Pim-1 or a partial peptide thereof, or a salt thereof.

21. An anticancer agent potentiator, wherein the potentiator comprises a compound or a salt thereof that inhibits the expression of a gene of serine/threonine kinase Pim-1 or a partial peptide thereof, or a salt thereof.

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22. An anticancer agent potentiator, wherein the potentiator comprises a polypeptide

comprising an amino acid sequence that is identical to or substantially identical to a polypeptide comprising the amino acid sequence of SEQ ID No: 3.

23. An anticancer agent potentiator, wherein the potentiator comprises an antibody against serine/threonine kinase Pim-1 or a partial peptide thereof, or a salt thereof.
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24. The preventive and therapeutic agent for cancer of claim 20 or 21, wherein the cancer is pancreatic cancer.
- 10 25. The preventive and therapeutic agent for cancer of claim 22, wherein the cancer is pancreatic cancer.
26. A polynucleotide comprising a nucleotide sequence having homology of at least 95% or more to:
15 (a) a polynucleotide comprising the nucleotide sequence of SEQ ID No: 4, or a cDNA polynucleotide that can hybridize to a polynucleotide comprising the nucleotide sequence of SEQ ID No: 4; and
(b) a polynucleotide comprising a nucleotide sequence encoding a polypeptide comprising an amino acid sequence that is identical to or substantially identical to the amino acid sequence of
20 SEQ ID No: 3, or a cDNA polynucleotide that can hybridize with a polynucleotide comprising a nucleotide sequence encoding a polypeptide comprising an amino acid sequence that is identical to or substantially identical to the amino acid sequence of SEQ ID No: 3.
27. A recombinant vector comprising the polynucleotide of claim 26.
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28. A host cell carrying the expression vector of claim 27.
29. A method for producing a polypeptide or a salt thereof, which comprises an amino acid sequence that is identical to or substantially identical to the amino acid sequence of SEQ ID No:
30 3, wherein the method comprises the steps of culturing the host cells of claim 28 under conditions suitable for expression of the polypeptide and collecting the polypeptide from the obtained culture.
30. A preventive or therapeutic agent for cancer, wherein the agent comprises the polynucleotide of claim 26 or the recombinant vector of claim 28.
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31. An apoptosis-inducing agent that comprises the polynucleotide of claim 26 or the recombinant vector of claim 28.
32. An anticancer agent potentiator, wherein the potentiator comprises the polynucleotide of
5 claim 26 or the recombinant vector of claim 28.
33. A method for preventing or treating cancer, wherein the method comprises administering a
mammal with an effective amount of a compound or a salt thereof that inhibits the activity of
10 serine/threonine kinase Pim-1 or a partial peptide or salt thereof, or with a compound or a salt
thereof that inhibits the expression of a gene of the above-mentioned peptide or partial peptide or
salt thereof.
34. An apoptosis-inducing agent, wherein a mammal is administered with an effective amount
of a compound or a salt thereof that inhibits the activity of serine/threonine kinase Pim-1 or a
15 partial peptide or salt thereof, or a compound or a salt thereof that inhibits the expression of a
gene of the above-mentioned peptide or a partial peptide or salt thereof.
35. A method for treating a patient who has a solid cancer in which anticancer agent resistance
has been induced by hypoxia, wherein the method comprises suppressing the expression of
20 serine/threonine kinase Pim-1 in a solid cancer cell.
36. The method of claim 35, wherein the solid cancer is pancreatic cancer.
37. A method for reducing anticancer agent resistance in a pancreatic cancer under hypoxic
25 conditions, wherein the method comprises introducing dominant-negative Pim-1 to a pancreatic
cancer in which anticancer agent resistance has been induced by hypoxic conditions.
38. A method for reducing the tumor-forming ability of a pancreatic cancer cell, wherein the
method comprises introducing dominant-negative Pim-1 to a pancreatic cancer cell.
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39. A solid cancer cell which is a dominant-negative Pim-1 transfectant.
40. A pancreatic ductal adenocarcinoma which is a dominant-negative Pim-1 transfectant.
- 35 41. A method of screening for substances that enhance or inhibit the activity of
serine/threonine kinase Pim-1, wherein the method comprises the steps of:

contacting a test substance with serine/threonine kinase Pim-1 or a partial peptide thereof, or a salt thereof; and

detecting the phosphorylation activity of serine/threonine kinase Pim-1.

5 42. The method of claim 41, wherein the phosphorylation activity is detected by using, as an indicator, a change in the expression level of a reporter gene that is activated in response to binding of a serine/threonine kinase Pim-1 phosphorylation substrate.

10 43. The method of claim 41, wherein the phosphorylation activity is detected using an antibody that recognizes the phosphorylated form of the serine/threonine kinase Pim-1 phosphorylation substrate.